

particular honour to have proposed it to you, as I shall be proud of every opportunity to approve myself,

Dear Sir,

Your most obedient

London, Dec. 14, 1762.

humble servant

Daniel C. Solander.

**CVII.** *An Account of the Male and Female Cochineal Insects, that breed on the Cactus Opuntia, or Indian Fig, in South Carolina and Georgia: In a Letter from John Ellis, Esq; to Peter Wych, Esq;*

S I R,

Read Dec. 23, 1762. **F**INDING the natural history of Co- chineal still defective, (notwithstanding the diligent inquiries that have been made by many curious persons into the nature and oeconomy of this valuable insect) for want of a description of the Male, I took the first opportunity of endeavouring to illustrate it.

Hearing then that this insect bred in great abundance on the Cactus Opuntia of Linnaeus's Species Plantarum, p. 468. in South Carolina and Georgia, where it is a native and grows in great plenty, as well as on the Cactus Coccinellifer of the same author, which grows in Mexico, and has been for these many years introduced

introduced into Jamaica, I wrote to Dr. Alexander Garden, of Charles Town, South Carolina, to send me some of the joints of the Cactus Opuntia, with the insects on it; which he did the latter end of the year 1757. These specimens were full of the nests of this insect, in which it appeared in its various states from the most minute, when it walks about, to the state, when it becomes fixt, and wrapt up in a fine webb, which it spins about itself.

These I had the honour to lay before the Royal Society, and afterwards, with a view to encourage the propagating and collecting them in our colonies, I exhibited the same to the Society for encouraging Arts, Manufactures, and Commerce, who chearfully granted several large premiums; the obtaining of which nothing can disappoint, but scarcity of hands at present in our colonies. The Female (which was here alive and in plenty) is well discribed by Mons. Reaumur, Dr. Brown of Jamaica, and lately by Dr. Linnæus, in his System of the animal kingdom, under the title of *Coccus Cacti Coccinelliferi* p. 457. n<sup>o</sup>. 17. from a living insect sent him from Surinam by Mr. Rolander in the year 1756, but neither Reaumur, Brown, nor Linnæus had ever seen the Male.

As this genus of insects is placed by Dr. Linnæus under the *Hemipteræ* or half winged, it may be necessary to know, that he comprehends in this class not only those, whose wings are half covered with a crustaceous case, but such also as have wings only on one sex.

In order to find out the Male fly, I examined all the webbs in these specimens besides a large parcel, which the Doctor had sent me picked off from the plants

plants in Carolina; and at last discovered 3 or 4 minute dead flies with white wings: these I moistened in weak spirit of wine, and examining them in the Microscope, I discovered their bodies to be of a bright red colour, which convinced me of their being the true male Cochineal insect: to be confirmed in my opinion I immediately communicated my discovery to Dr. Garden, which I accompanied with an exact Microscopical drawing, and desired he would send me some account of their œconomy, with some male insects of his own collecting, which he was so kind to do last spring with some observations on them, which are as follows.

“ In August 1759 I catched a male Cochineal fly and examined it in your aquatic Microscope. “ It is seldom a male is met with, I imagine there may be 150 or 200 females for one male. The male is a very active creature and well made, but slender in comparison of the females, who are much larger and more shapeless, and seemingly lazy, torpid, and inactive. They appear generally so overgrown that their eyes and mouth are quite sunk in their rugæ or wrinkles, nay their antennæ and legs are almost covered by them, and are so impeded in their motions from these swellings about the insertions of their legs, that they scarce can move them, much less move themselves.

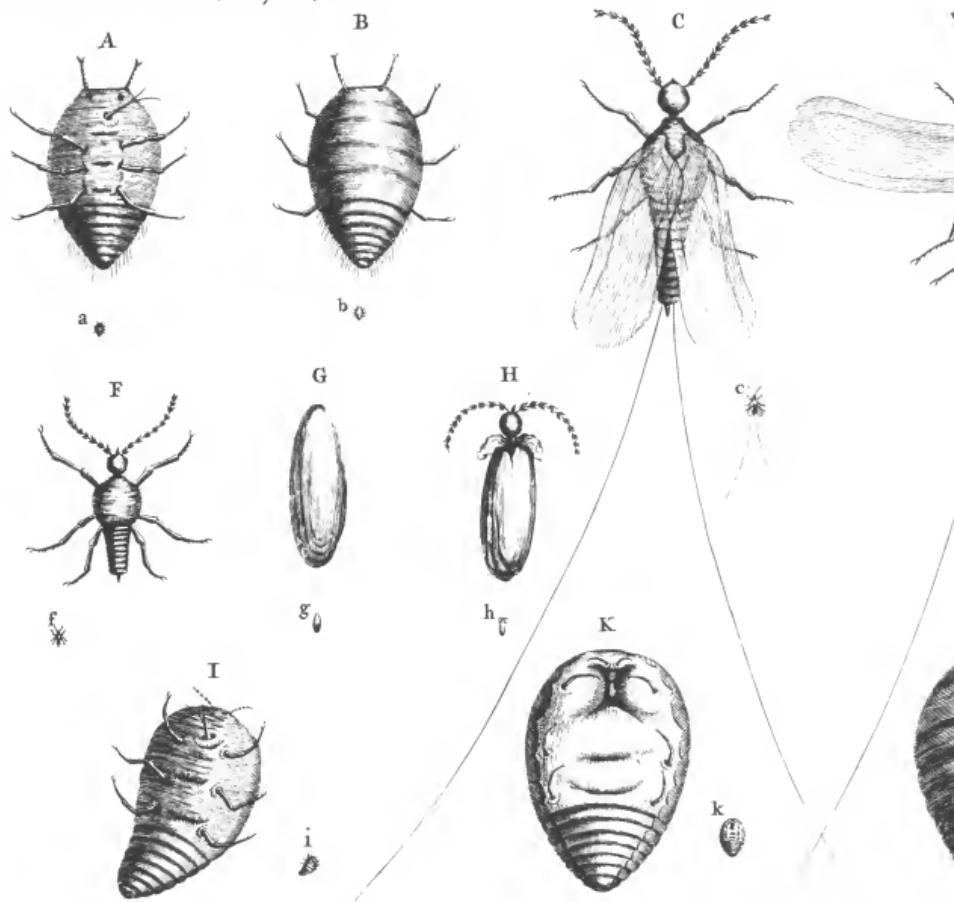
“ The male’s head is very distinct from the neck, the neck is much smaller than the head and much more so than the body. The Thorax is elliptical and something longer than the head and neck together, and flattish underneath: from the front there arise two long antennæ (much longer than

“ the antennæ of the females) which the insect moves every way very briskly. These antennæ are all jointed, and from every joint there come out four short setæ, placed two on each side.

“ It has three jointed legs on each side, and moves very briskly and with great speed. From the extremity of the tail, there arise two long setæ or hairs, four or five times the length of the insect. They diverge as they lengthen, are very slender and of a pure snow white colour. It has two wings which take their rise from the back part of the shoulders or thorax and lie down horizontally like the wings of the common fly, when the insect is walking: they are oblong, rounded at the extremity, and become suddenly small near the point of insertion: they are much longer than the body and have two long nerves, one runs from the basis of the wing along the external margin and arches to meet a slender one that runs along the underd an inner edge: they are quite thin, slender transparent, and of a snowey whiteness. The body of the male is of a lighter red than the body of the female, and not near so large.”

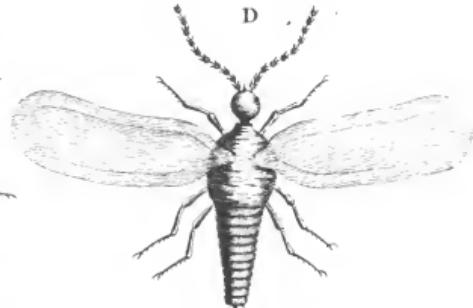
To this description of Dr. Gardens, which agrees very nearly with the annexed microscopical drawings of both sexes of this insect, A and C. Tab. XXI. I must add that the female has a remarkable proboscis or awl shaped papilla, that arises in the midst of the breast. This Linnæus calls the Rostrum, and thinks it the mouth; if so, besides the office of supplying it with nourishment during the time of its moving about, it is the tube through which the fine double filament proceeds, with which it forms its delicate white webb





A. The Female Cochineal Insect, on its back, magnified. B. The same on its belly, magnified. C. The Male Cochineal Insect, extended, magnified. D. The Male Cochineal Insect, in a side view flying, magnified. E. The Male Cochineal Insect, in a side view, magnified. F. The Male Insect, as it is found when the wings are expanded. G. The Silk-bag cut open, which discovers the Head of the Male Insect, magnified. H. The Silk-bag cut open, which discovers the Head of the Male Insect, magnified. I. The appearance of the Female Cochineal Insect, when it comes to perfection and big with young, magnified. J. The Egg of the Female before it opens. K. The Egg of the Male. (a. & b.) The natural size of the Female Cochineal Insect, when it creeps about. (c. & e.) The natural size of the Male Cochineal Insect. (f. & g.) The Egg of the Female. (h. & i.) The Egg of the Male. (j. & k.) The Egg of the Female.





J. Mynde sc.

mfied. - C. The Male Cochineal Insect, as it walks, magnified. - D. The Male Cochineal Insect, with its Wings ex-  
The Male Insect, as it is found without Wings, magnified. - G. The Silk-bag, which the Male Insect spins, before its  
Insect, magnified. - I. The appearance of the Female when it first begins to spin, magnified. - K.L.M. The front, back, &  
with young, magnified. -

The natural size of the Male Cochineal Fly, in three different Views. - (f.) The Male Insect, as it is found without wings. - (g.)  
Male Fly. - (i.) The Female before it spins. - (k.l.m.) The natural size of ♀ Female Cochineal when it becomes fit for use, in 3 Views.

webb in order to accommodate itself in its torpid state, during its pregnancy; till the young ones creep out of its body, shift for themselves, and form a new generation.

In this torpid state the legs and antennæ grow no more, but the animal swells up to an enormous size in proportion to its first minute creeping state. The legs, antennæ, and proboscis are so small with respect to the rest of the body, that they cannot be easily discovered without very good eyes or magnifying glasses; so that, to an indifferent eye, it looks full as like a berry as an animal.

This was the occasion of that contest mentioned by Pomet and other authors, which subsisted so many years, whether it was an animal or a vegetable production. But if persons of curiosity would give themselves the trouble to soak a few grains of the common Cochineal of the shops in warm water for 24 hours, they will observe them to swell up to their original shape; so that the legs, antennæ, and proboscis may be discovered. What is remarkable in the proboscis is, that we shall find in many of them the ends of two fine hairs or filaments remaining, with which it forms its webb, not unlike the silk worm; which always spins its cocoons with two threads, which, as they come out, unite together, with the natural gluten of the animal.

Further, if this animal, thus expanded by moisture, is opened in a watch glass with a fine lancet in a little water, a great number of eggs with the young animals in them may be discovered, which will exhibit a very agreeable scene of a most vivid crimson hue.

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As soon as the female insect is delivered of its numerous progeny, it becomes a meer husk and dies; so that great care is taken in Mexico, where it is principally collected, to kill the old ones while big with young, to prevent the young ones escaping into life, and depriving them of that beautiful scarlet die so much esteemed by all the world.

I am,

Sir,

Park-Street, Westminster, Your most obedient servant,  
December 23, 1762.

John Ellis.

P. S. The

P. S. The following are the characters of this insect called *Coccus Cacti Opuntiae*, drawn up in Latin in the systematical manner of Doctor Linnaeus, to be placed among the insecta hemiptera.

*Coccus Cacti Opuntiae.*

*Mas alatus.* — *Corpus* magnitudine pulicis, glabrum, rubrum.

*Caput* globosum; *Antennae* moniliformes, thorace paulo longiores decem articulatæ. *Collum* protractum. *Thorax* ovatus postice truncatus.

*Abdomen* thorace paulo longius, postice angustatum, segmentis decem, ultimo appendice subulato brevi terminato.

*Setæ caudales* duæ, capillares, corpore quadruplo longiores.

*Alæ* oblongæ, abdomine longiores apice rotundatæ, basi angustatæ, thoracis ante medium insertæ.

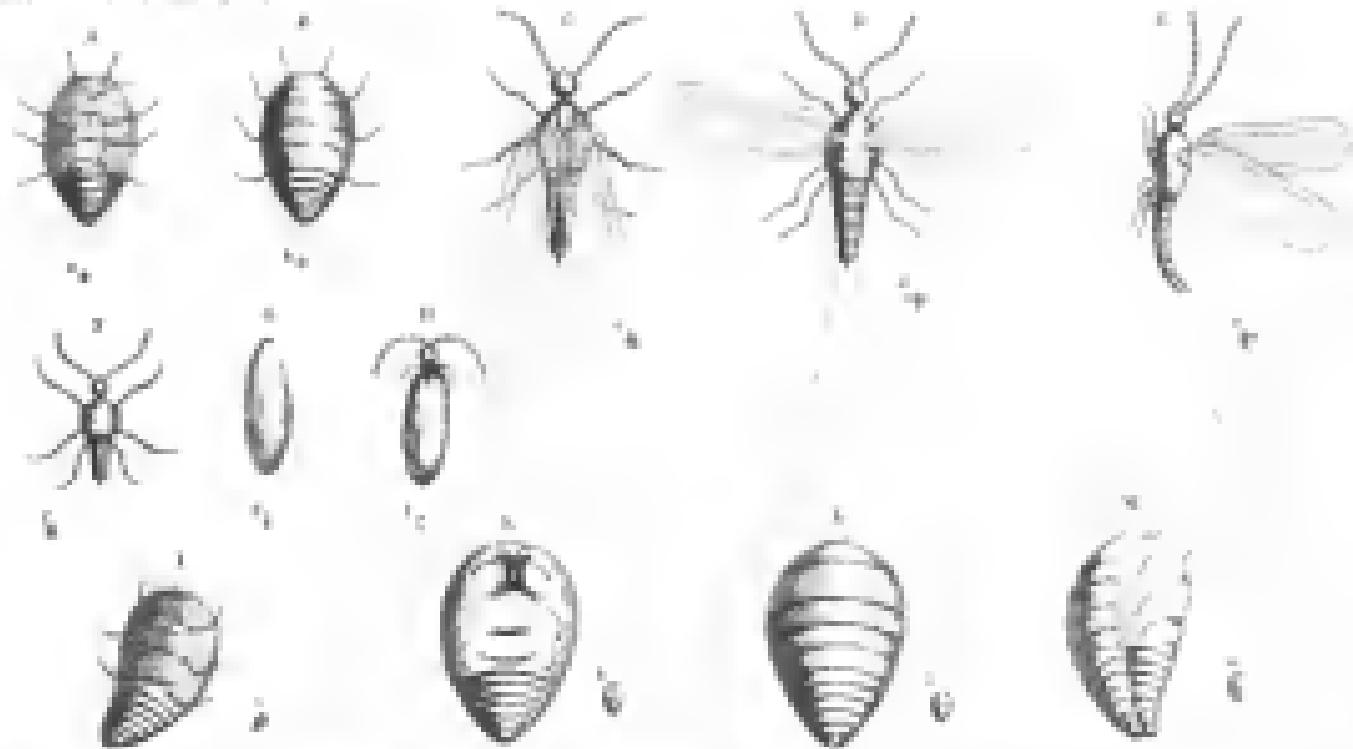
*Pedes* sex subæquales.

*Femina aptera.* *Corpus* magnitudine seminis viciæ, ova-  
tum, rubrum, rugosum. *Antennæ* breves articulatæ.

*Pedes* 6, in junioribus inserti, sed in adultis intra rugas conditi, uti et artus reliqui.

*Thorax* glaber supra convexus, rugosus, subitus planiusculus, abdomine du-  
plo longior.

*Rostrum* vel os punctum subulatum e  
medio pectoris, segmenta abdominis in  
junioribus margine pilosa.



A, *Archaeolaelaps* larva in first instar. B, *Acarus acanthophagellus*. C, *Brachycaudus* larva in fourth instar. D, *Brachycaudus* pupa in 4th instar. E, *Brachycaudus* larva in 5th instar. F, *Brachycaudus* pupa in 5th instar. G, *Brachycaudus* larva in 6th instar. H, *Brachycaudus* pupa in 6th instar. I, *Brachycaudus* larva in 7th instar. J, *Brachycaudus* pupa in 7th instar. K, *Brachycaudus* larva in 8th instar. L, *Brachycaudus* pupa in 8th instar. M, *Brachycaudus* larva in 9th instar. N, *Brachycaudus* pupa in 9th instar. O, *Brachycaudus* larva in 10th instar. P, *Brachycaudus* pupa in 10th instar. The drawings are based on the descriptions of the insects by Dr. J. C. Gahan in the Royal Society's Philosophical Transactions, Vol. 216, 1826, pp. 121-122. The drawings are arranged in three rows of six, with the first row being the smallest and the last row being the largest.